EFFECT OF GAS FLOW RATE DURING METAL INERT GAS (MIG) WELDING ON TENSILE STRENGTH

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"I declared that this thesis is the result of my own work except the ideas and summaries which I have clarified their sources. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any degree."

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ABSTRACT

This final project is a study about the effect of different gas flow rate used in Metal Inert Gas (MIG) welding on mechanical properties. Other variables such as stand off, current and speed of the welding were fixed. The parent metal consisted of mild steel with 5 mm thickness. MIG welding were chosen because it is widely used in many welding application nowadays. The advantages of MIG welding include capability to weld in all position, has higher deposition rates than Shielded Metal Arc Welding, less operator skill required, and long welds can be made without starts and stops. 5 different gas flow rates were used in the study; 5 liter/min, 10 liter/min, 15 liter/min, 20 liter/min and 25 liter/min. The study emphasizes on optimizing the best flow rate that could produce good quality welding, in which evaluation was made from non-destructive and destructive evaluations. The study consists of 2 phases, the welding phase and the post-welding phase. In welding phase, for each gas flow rate, 2 mild steel plates were joined. In post-welding phase, the welded specimen then undergoes non-destructive testing. For non-destructive testing, ultrasonic test was conducted to determine welding quality and to check any existence of internal defects such as porosity, discontinuities, and void. Later, the shaped welded specimens were prepared for destructive evaluation. As destructive evaluation is considered, tensile test was performed, in order to determine the tensile strength values for each welded specimen. Finally, the fractured surface of each specimen was observed in order to strengthen and justify the findings from both non destructive and destructive evaluations. The results shows that gas flow rate of 10 *l/min* give the highest tensile strength which relates to the lowest amount of discontinuities presence and the highest welding penetration in that particular specimen.

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